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ABSTRACT

Focusing on some significant events of 1971 relating to the use and management of natural resources, this report points out that environmental concern is coming of age. Government activities, congressional messages and action, major court cases, and citizen action are reviewed in the light of growing public acceptance of environmental quality as an important goal of national policy. Measures aimed at controlling degradation and preserving the environment are highlighted. Areas of concern include pollution, solid wastes, recycling, nuclear and atomic energy, weather and hurricane modification, effluent taxes and regulations, petroleum prices, expropriation of foreign owned property and resulting compensation, electricity rate structures, international rules for fisheries, preparations for the 1972 U.N. Conference on the Human Environment, development of new towns, creation and implementation of land use policies, and forest management. (BL)

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RESOURCES

This issue reports on some significant events of 1971 relating to the use and management of natural resources

Some Highlights of 1971

NUMBER 39 RESOURCES FOR THE FUTURE, INC. JANUARY 1972

ENVIRONMENT: A COMING OF AGE

THE ENVIRONMENTAL CONCERN is coming of age. While 1970 was a year of growing environmental consciousness during which much of the legal and administrative apparatus was created, 1971 has been a year of serious-minded, more detailed, and more sophisticated attention to environmental problems. The excitement of 1970 has crested, but in its wake we have both instruments for attacking our problems and a far more knowledgeable, if somewhat less agitated, public. Events of the past year provide evidence that environmental concern and action will not be merely ephemeral, as some had feared.

At the federal level, the major environmental agencies were all created during 1970 (see *Resources,* January 1971, pp. 14-17). The National Oceanic and Atmospheric Administration (NOAA)—largely a regrouping of older agencies such as the Weather Bureau and the Coast and Geodetic Survey—has not been associated with the more newsworthy environmental issues of the year, although important work on ocean pollution progresses under its auspices. The Council on Environmental Quality (CEQ) emerges as the most freewheeling of the agencies, concentrating on new policy overtures and on topical issues requiring attention. It has been the most articulate environmentalist voice within the government. The Environmental Protection Agency (EPA) enjoyed its first full year of operation in 1971 and proved to be an active operating agency. A proposed department of natural resources, intended to embrace EPA, NOAA, and the major federal resource agencies, has not prospered in Congress.

Two documents issued during the year—the President's message on the environment and the *Second Annual Report* of the CEQ—give a clue to the direction in which official policy is moving. The President's message called for a wide variety of environmental measures aiming to control pollution, deal with emerging problems, and influence land use. The proposals were unspectacular, perhaps reflecting the calmer mood of 1971, but they were responsive to some of our most urgent environmental problems. Congressional action has been sluggish on these, as on other matters during the year, so few of the proposals have made their way into law.

Among the proposals most interesting to economists were those for emissions charges on sulfur oxides and for a special tax on leaded gasoline. Both proposals incorporate the principle that the price of goods "should be made to include the cost of producing and

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disposing of them without damage to the environment."

With respect to water quality, the emphasis in the President's message was placed on readier availability of funding for municipal waste treatment facilities and on the establishment and enforcement of standards and regulations. Water quality standards would be supplemented by effluent limitations, and new industrial plants would be required to use the best available technology to preserve water quality. The effluent charge approach, favored in the case of the air pollutants mentioned above, was conspicuously avoided for water.

Senator Muskie carried this penchant for the regulatory method still further in a bill adopted by the Senate. The Muskie bill would control pollutants at the source, requiring all industrial plants to use the best available water pollution control technology by 1976 and both industry and municipalities to eliminate all discharges to water by 1985. Though mindful of the wrath of the environmental lobby, the Administration nonetheless has opposed this measure as too costly.

Pesticides also received primary attention in the President's message. They would be divided into three categories and their use controlled accordingly. Those designated as for general use would be available to the public. Restricted use pesticides would be applied only by an approved applicator, while a still more restrictive category, "use by permit only," would be made available only upon the advice of an approved pest control consultant. The presumption is that many of our problems with pesticides stem from careless or excessive use and that if this can be controlled they need not be banned entirely. Assuming that competent and conscientious "applicators" and "consultants" do their jobs, at least some of the worst abuses of pesticide use can be avoided in this way.

The message also dealt with oil spills, ocean dumping, recycling paper, control of toxic substances, noise, power plant sitings, and international cooperation. A major emphasis went to land use planning and public lands management (see "Land Use Policy" and "The Public Lands," this issue) and to natural environments, parks, and historic sites. All in all, it represents a rather broad approach to environmental issues.

THE SECOND ANNUAL REPORT of the CEQ coming out in August further reflected the new sophistication on environmental affairs. While it reinforced the points made in the President's message and reported on the gamut of government activities in the field, it also provided a fresh and well-done treatment of economic issues relating to the environment.

The *Report* described for the first time a serious effort to estimate some of the costs of pollution and to juxtapose them against the costs of control. Pollution abatement costs, heavily qualified with respect both to concept and coverage, were estimated to be about $105 billion for all kinds over a six-year period, 1970–75, or $18.3 billion on an annualized basis by 1975. Solid waste would be the most costly to manage—41 percent of the total—while air and water pollution standards could be met for $62 billion over the six years. It was figured that an annual cost of $4.7 billion by 1975 would suffice to eliminate most of the air pollution damages that now run to about $16 billion per year. The *Report* went on to note that by 1975 the annual costs would amount to about 1.4 percent of GNP, and it discussed the impact of such costs on different groups in the economy attaining environmental goals. Both the regulatory approach and the effluent charges method of meeting environmental standards were discussed; the *Report* stressed that they are not mutually exclusive but can be combined so as to reinforce one another, making use of the best features of each (see "Effluent Taxes," this issue).

The *Report* is a thoroughly civilized document, well-written, broad-ranging, thought-provoking, and full of solid recommendations. It mirrors as well as anything can the more substantial basis for evironmental action in 1971.

CONCERN ABOUT THE ENVIRONMENT arose spontaneously outside the government. While government has moved quickly to provide an institutional framework for dealing with these problems, the vitality and effectiveness of citizen concern remain striking. In the American tradition of voluntarism, we have been unwilling to leave it all to the government. By the nature of environmental problems, however, there is a limit to what we can do as individuals or in association to correct environmental ills—we can be effective only if there is the authority of law to support required action. In this circumstance our irrepressible citizens have become adept at using the courts and administrative procedures in ways that permit a direct voice to the public in deciding issues. Both the courts and the agencies have adapted to this, some more readily than others; the impressive aspect is the degree of flexibility shown. Administrative procedures provide for public participation in decision making, and in many cases environmental groups have been successful in establishing the standing that permits them to sue in the courts to prevent or overturn decisions they oppose or to require correction of unacceptable conditions. (Some of the more notable cases are discussed in "Environmental Skirmishes," this issue.)

Of course, these actions must be brought in the name of the law, alleging failure to proceed correctly or to consider range of facts required for decision. They relate only to specific decisions and do not substitute for government policy on the matters concerned. While greater openness to public participation will beget cases of harassment and obstruction, on the whole it provides a useful check on administrative authority. In some cases, especially with regard to air pollution, the citizen also gains the right to bring suit against private persons where existing law is not being enforced.

The scope of the environmental concern is indeed broad; at many points it blends into more traditional areas such as conservation, public health, industrial safety, and social welfare. While it has succeeded in establishing a core area of its own, the fresh look at the environment has enriched and revitalized these other areas as well. It will be

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important to maintain the broadest view as attention moves from the most obvious and specific environmental problems into larger areas such as safety, land planning, and the long-term effects of many low-level but chronic exposures. The proposals of the past year, if enacted and enforced, suggest that we need not anticipate an early doomsday—in fact, we may even be able to breathe and swim a few years hence with more pleasure than now.

ENVIRONMENTAL SKIRMISHES

GROWING PUBLIC acceptance of environmental quality as an important goal of national policy was reflected during 1971 in the number and variety of conflicts over specific issues. There was an increasing tendency to go to court, although recourse was also had to legislative and administrative action. In all three of these areas existence of the National Environmental Quality Act of 1970 often gave more leverage to defenders of the environment.

In most of the major contests purely environmental issues became intertwined with other considerations. The supersonic transport controversy, for instance, brought forth much discussion of possible damage to the upper atmosphere and the effects of sonic booms but economic questions also played an important role when the Senate last summer defeated the proposed additional subsidy to Boeing.

Among the year's unresolved environmental skirmishes a handful that have interesting implications for the future are noted below.

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SMOKE AT FOUR CORNERS. Power production in the Four Corners area, where Arizona, New Mexico, Utah, and Colorado meet, is generating environmental controversy as well as electricity. With two large coal plants already in operation, work on four more went forward in 1971 in the face of widespread opposition, which included legal action seeking to block further construction. Air pollution was not a national concern when in 1963 the first of the big plants began production in sparsely settled country far from any large city.

More recently, visibility has decreased and haze increased in the area. The principal blame for this is laid upon the very small fly-ash particles from the plants. These particles stay suspended in the atmosphere for long periods and are trapped in the natural basin between the Rockies and the Jemez mountains. The plants also emit large amounts of sulfur dioxide and nitrogen oxides.

The power companies are installing more efficient precipitators on the present plants in order to reduce the fly-ash emissions to roughly 10 percent of present levels. The construction of four more plants of similar size and with precipitators of similar efficiency would presumably result in emissions of about 30 percent of present levels. However, the question of just what levels might be reasonable is unresolved and involves not only completion of plants under construction but also longer-term expansion plants. Also in question are the possible effects of sulfur dioxide and nitrogen oxide emissions. In some of the areas using the power from Four Corners, notably Los Angeles, air pollution regulations would not permit the construction of such plants. Whether the effects of the emissions are similar in the two locations does not dilute the emotional argument.

Strip mining of coal on Black Mesa is also an issue, although currently of less concern than it is in the East. The different nature of the physical environment, the low population density, and absence of a long history of environmental outrages through stripping may be the reasons. Reseeding and landscaping of the mined area have been promised.

Thermal pollution does not appear to be a major issue at present, but other water problems are causing concern. For example, coal moves from Black Mesa to the Mohave generating plant through a coal slurry pipeline. To obtain the water for the slurry, 120,000 gallons per hour are pumped from deep wells on the Mesa. There is fear that these wells will eventually lower the water table and thus dry up tribal grazing land.

National environmental groups have joined those in the area opposing further development. The Department of the Interior has prepared environmental statements, as called for by law, on various aspects of the power development. However, these required statements deal with very limited aspects of the problem, such as transmission lines and railroad rights-of-way. In recognition of the need for a much broader look at the question of

power and the environment in the Southwest, the Interior Department has organized a multi-agency group to conduct a study of the overall problem. The Environmental Protection Agency, the Council on Environmental Quality, the Federal Power Commission, the Atomic Energy Commission, and others are participating in a Southwest Energy

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Study, which is scheduled for completion within the next few months. The Secretary of the Interior does not plan to make any decision on new licenses until then.

Meanwhile, environmental groups and some local interests have entered suits against the Secretaries of the Interior and the Army in an effort to halt further construction of the power plant complex. (The Interior Department is involved because of its interest in Indian lands and part ownership, with the Navajo, of one of the generating plants. The Department of the Army is involved in some of the cases because of water rights.) Although the suits were originally brought in Washington, D.C., a federal judge in early fall allowed a motion to transfer them to the district court in Phoenix, which is much nearer to the site of the power plants. This transfer has the merit of making the hearings more accessible to those most closely involved. However, it will make it more difficult to use the environmentally oriented legal talent that is available in Washington. At the close of the year the plaintiffs were appealing the transfer of jurisdiction.

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THE TRANS-ALASKA PIPELINE. Temporary injunctions granted in 1970 continued during 1971 to block construction of the proposed 800-mile pipeline that would carry oil south from Alaska's North Slope to Valdez on the Gulf of Alaska. But by the close of the year further developments in at least one of the cases appeared imminent.

In that action three conservation organizations sued the Secretary of the Interior to require publication of an environmental impact statement as called for in the National Environmental Policy Act. Last summer the Department of the Interior held public hearings on a draft impact statement, and subsequently began to prepare a final version whose publication is expected early in 1972. Meanwhile the plaintiffs have contended that publication will not meet the requirements of the act unless the statement includes analyses of (1) whether a route through Canada would be preferable and (2) the need for producing the North Slope oil in any case. Secretary Morton has disagreed with this view, so further litigation may follow.

In their suit the environmentalists cited danger of permafrost subsidence, impediments to wildlife migration, probability of pipeline breaks in areas of high seismic activity, and possible large oil spills in the waters of Prince William Sound. A second lawsuit has been brought by a group of Cordova fishermen who fear the increased tanker and terminal activity in Prince William Sound will seriously threaten their livelihood.

Thus the future of the Alaska pipeline still is doubtful. The oil companies, who are sitting on a major field of some 10 billion barrels of proven reserves in which they already have invested about a billion dollars, are anxious to bring the oil to market. If legal delays continue, the oil companies might as an alternative consider applying to the Canadian government for permission for an overland oil pipeline. They already have taken preliminary steps in regard to a natural gas pipeline. Either right of way might entail economic and political complications and would surely be scrutinized closely by conservationists.

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MINERAL KING. In the Mineral King case, one aspect of which was before the Supreme Court at the close of 1971, the issue is between development for commercial recreation and preservation of wilderness values.

Mineral King is an area of some 15,000 acres comprising a high, narrow valley ringed by 12,000-foot peaks and alpine bowls in the Sierra Nevada Mountains of south-central California. Though part of the Sequoia National Forest, it is almost entirely surrounded by the Sequoia National Park.

In January 1969, the U.S. Forest Service approved a plan submitted by Walt Disney Productions for development of Mineral King as a year-round, high-density recreation complex, with particular emphasis on downhill ski facilities. The proposed development was immediately opposed by the Sierra Club and others on grounds (1) that it would destroy existing wilderness values, and (2) that the enlarged all-weather access road required through the Sequoia National Park would impair wilderness values there, and would in any case be illegal.

The Forest Service noted that the Sierra Club had itself consistently supported the development of ski facilities there. Replying that this support had been based on an assumed modest development, the Sierra Club took the matter to court, winning a preliminary injunction against the start of construction. In the fall of 1970 this decision was reversed by a U.S. Court of Appeals, on grounds that the club's general interest in conservation was insufficient to give it legal standing as sole plaintiff. The issue is now before the Supreme Court, which is expected to rule on the question of the Club's standing sometime in the spring of 1972. The ruling will have significant repercussions beyond the particular case, and on the environmental defense movement generally which has increasingly made use of litigation.

Opponents of the Disney–Forest Service project contend that Mineral King is ecologically part of the Park, and should be given the same

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statutory protection. It was, in fact, initially excluded from the Park only because of a now defunct mining activity. Currently it is used by summer residents and larger numbers of hikers, campers, fishermen, and cross-country skiers. As a wildlife refuge it is visited also by students of natural history. Though use in all these categories has been increasing rapidly in recent years, it is still small in comparison with that envisioned by the Disney project.

Proponents of the project point to the large and growing demand, especially in southern California, for ski and other developed recreation facilities that Mineral King is superlatively equipped to provide. It is asserted, moreover, that the presence in the valley of various structures associated with the current recreational and other uses, along with the evidences of the old mining operations—and the existing access road—make the area unfit for inclusion in the Wilderness System.

Not at issue in the current legal proceedings, but relevant from an economist's point of view, is the question of whether the benefits from an additional high-density recreation development of the sort proposed would outweigh the direct costs of its construction, including improvement of the access road, plus the values that would result from alternative uses.

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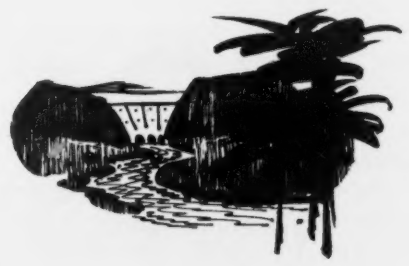

HELLS CANYON. The controversy over harnessing the last reach of free-flowing water in the Hells Canyon of the Snake River has been going on for nearly 20 years. The latest, but not the last, chapter in the long story was written last February when the Presiding Examiner of a Federal Power Commission hearing decided that a license for hydroelectric power should be issued subject to a five-year delay, during which the Middle Snake might be included in a federal land reservation as part of the National Wild and Scenic Rivers System or for park or recreation purposes.

Exceptions to the decision were entered by the applicants, as they were by the FPC staff counsel, who had recommended against development. At the close of the year the FPC itself had not acted upon the Presiding Examiner's decision. The Commission's action, whatever it may be, could be appealed to a federal court. If the Examiner's decision should stand, the future of Hells Canyon will depend upon whether Congress before February 1976 establishes it as a type of reservation that would preclude its use for water development. Various conservation organizations are pressing proposals to this end.

Hells Canyon is the deepest gorge in North America. Its ecology represents virtually all of the life zones found on the continent, providing habitat for a great variety of wildlife and fish. Some of the finest salmon and steelhead fishing is provided by this stream, and the primitive surroundings along with those of the adjacent Wallowa Mountains on the Oregon side provide the only truly wilderness big game hunting opportunities remaining in Oregon.

The present controversy had its origins in 1954, when the Pacific Northwest Power Company applied to the FPC for a license to build two low dams at Mountain Sheep and Pleasant Valley sites in Hells Canyon. In the complicated maneuverings that followed, the site proposals were modified; a rival application from the Washington Public Power Suppy System was first denied by FPC and later consolidated with that of PNCP; and the Department of the Interior entered the case, first to propose development under its auspices, and later to oppose development for an indefinite period.

The Power Commission's subsequent granting of a license for development was appealed to the Supreme Court, which in 1967 remanded the case to FPC for further study of two issues: (1) whether development should be undertaken by the federal government or by private or non-federal public utilities, and (2) whether it would be in the public interest to inundate the remaining portion of the free-flowing river. The subsequent FPC hearing opened in September 1968 and the record was closed in March 1970. It was on the basis of this hearing that the Presiding Examiner's decision was presented last February.

THE FLORIDA BARGE CANAL

THE CORPS OF ENGINEERS project to build a Cross-Florida Barge Canal from the St. Johns River to the Gulf of Mexico had become increasingly controversial, but the presidential stop-order of January 1971 was a surprise to canal opponents and proponents alike. President Nixon's order halting the canal project as environmentally unsound was issued even though nearly a fifth of this $179 million undertaking had been completed, and almost $51 million spent. The Administration action saved a still largely undisturbed stretch of the Oklawaha River, described by the President as a "uniquely beautiful semi-tropical stream."

The barge canal project was authorized by Congress in 1942, but construction was not begun until 1964. In order to reduce excavation costs and to have a convenient supply of water for lockage, the Corps of Engineers routed the canal through a 40-mile stretch of the lower Oklawaha basin. The natural features of this part of the basin, both the river itself and the associated hydric hammock and swamp forest, were to be largely obliterated by two reservoirs. One of these, named "Lake Oklawaha," already had been formed by the time of the President's stop-order.

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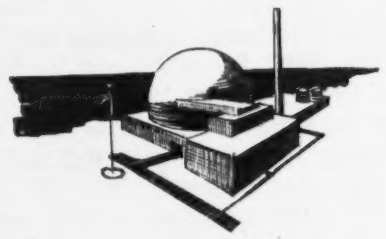
The Florida Defenders of the Environment (FDE), the university-based group leading the opposition, attacked the project on economic as well as environmental grounds. The Corps of Engineers had claimed major recreation benefits for the two reservoirs even though the Oklawaha region has hundreds of natural lakes. FDE had gone to a federal district judge and just four days before the President's order obtained a preliminary injunction stopping work on two segments of the canal.

The President's order involves some interesting precedents. First, the project would probably still be going forward if the Council on Environmental Quality, created under the National Environmental Policy Act of 1970, had not been available to advise the President. Establishment of the Council has given environmental and conservation groups an opportunity to press their causes at a high level within the Administration and apart from the usual tortuous bureaucratic channels. The barge canal issue was one of the first matters referred to the new Council.

The second precedent was the stop-order itself, by which the President in effect told the Congress that a $50 million mistake had been made, which he was correcting before the bill ran any higher. The Florida Canal Authority, a state agency that has spent some $13 million in local tax funds on land acquisition for the canal, is now suing to demand that the Corps of Engineers continue the project. Canal Authority attorneys contend that the President is guilty of an "unconstitutional arrogation" of congressional prerogatives and that the project remains alive until formally deauthorized. But Congress has not yet challenged the President's action, and in fact has seemed to go along with the stop-order by appropriating only enough funds to meet Administration recommendations for phasing out the project.

A third precedent will be set if the Administration seeks to drain the existing reservoir in order to allow the entire river to return to its original channel. Such a dismantling would run counter to the conventional wisdom that construction of a dam and reservoir represents an irrevocable commitment. There is strong sentiment within the Administration for restoring the Oklawaha and designating it as a "national river" to be administered as a part of Ocala National Forest, which it adjoins. Proponents of the canal, however, choose to regard Lake Oklawaha as an outstanding feature of the environment and speak enthusiastically of its bass fishing and bird life. At their urging, the senior circuit judge specially assigned to the complex barge canal litigation granted a temporary injunction against the government's plans for saving several hundred trees at the upper end of the reservoir by lowering the water level. He held that construction of the reservoir had itself created "environmental, ecological, and recreational elements," which should be protected pending a ruling on the legality of the Administration's stopping of the canal project.

Whatever the outcome of the litigation, revival of the project appears, at the moment, highly unlikely. National as well as state conservation groups are strongly opposed to the canal, and Congress has little reason to resurrect the project, particularly when it is not popular even in Florida. Neither Governor Reubin Askew nor either of Florida's U.S. senators has called for work on the canal to be resumed.



Calvert Cliffs

BESET WITH PERSISTENT issues concerning the safety of nuclear power-plant operation, nuclear-fuel management, and, of course, weapons testing, the Atomic Energy Commission was this year confronted with yet another challenge. The Commission is compelled by court order to determine a broad range of "conventional" environmental consequences arising from each nuclear power plant for which a construction permit or operating license is sought. In the Calvert Cliffs case (named after the site of a nuclear plant being built on Chesapeake Bay), the U.S. Circuit Court for the District of Columbia ruled in July 1971 that the AEC had seriously lagged in carrying out the intent of the National Environmental Policy Act (NEPA) of 1969, having until recently confined itself solely to the evaluation of radiological hazards while ignoring such environmental impacts as thermal pollution. The Calvert Cliffs decision (which the AEC decided not to appeal) may therefore greatly broaden the AEC's role in decisions affecting the environment.

Although NEPA's effective date was January 1, 1970, the AEC did not require consideration of broader environmental issues in processing permit or license applications before March 4, 1971, arguing that it had not had any formal responsibility for evaluation of ordinary environmental effects. The court did not claim that environmental questions were wholly ignored in AEC proceedings, but it did maintain that they were examined casually and were a subordinate rather than an integral part of the process. Among other things AEC rules failed to require consideration of environmental issues by Atomic Safety and Licensing Boards in their independent review of AEC staff recommendations unless the issues were raised by outside parties or staff members. In the words of the court, "We believe that the Commission's crabbed interpretation of NEPA makes a mockery of the Act."

Compliance with NEPA will therefore force reconsideration of all pre-March 4, 1971 permit and license applications going back to January 1, 1970. A formidable number of nuclear power plants are involved: 97 reactors rated at 87,000-megawatt (mw) electrical capacity, for which 65 construction and operating license applications were pending. Late in the year, about a third of these were in various stages of construction, and a substantial portion of the reactors not yet under construction were well along in AEC processing. In addition, formal environmental re-

view will also be necessary for 5 operating licenses issued after January 1, 1970, for 3 fuel reprocessing facilities, and for 10 power reactors operating at reduced output under provisional licenses which must undergo full NEPA review when application is made for conversion to full power.

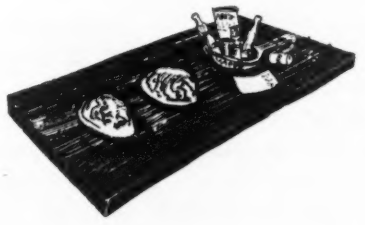
There is obvious concern about the immediate and longer-run implications of the Calvert Cliffs decision—how it will affect national and regional power supply during the next few years and what it may mean for future nuclear power plant decisions once a full array of environmental ramifications are factored into such plans. One of the more extreme options raised in the court decision was that the AEC "should consider very seriously the requirement of a temporary halt in construction pending [environmental] review and the 'backfitting of technological' innovations." Even if this path is not followed, anxiety has been expressed that electricity shortages may result from delays in bringing nuclear facilities on line. In a letter to AEC Chairman Schlesinger in mid-October, FPC chairman John Nassikas cited data showing that 16 percent of the nation's reserve for the summer of 1972 (or about 3 percent of overall U.S. generating capacity at that time) would be from scheduled nuclear plants not yet on line and that the potential loss anticipated would exceed 40 percent in several regional cases. "In addition, in many cases we are concerned that the reserve appears to be dangerously low, even with the scheduled nuclear plants."

Despite consternation in the utility industry over the Calvert Cliffs decision, the AEC has moved swiftly to deal with its newly defined and broad-ranging environmental responsibilities in the field of civilian nuclear power. Chairman Schlesinger served notice of the change in a speech to utility executives: "The traditional ways of doing business seem preferable. A utility could get on with the job of installing a 100- or 200-mw fossil-fueled plant and nobody really needed to be consulted save for the property owners and the local authorities, who could be dealt with on a private basis. Nowadays every plant seems to be drawn into public controversy. I can understand the nostalgia. The old ways were neater and more efficient, at least in a limited sense. But this is 1971. We are more crowded. There is a heightened public sensitivity on environmental issues—an insistence by the public that it be consulted. We shall all have to learn to operate under these changed conditions." Clearly, we are in for a period of intense activity as new AEC environmental procedures designed to comply with the court decisions are defined and embodied in future permit and licensing processes.

THE CALVERT CLIFFS decision held that for each proposed nuclear power project the particular economic and technical benefits of planned action must be assessed and weighed against environmental costs. It remains to be seen just how broadly this will be construed. For example, it is possible that, under future environmental reviews, cost-benefit analysis might compel resort to cooling towers to protect against thermal pollution. It is conceivable that the court's recommendations could extend into the area of transmission lines, to various aspects of the nuclear-fuel cycle, and even to weighing the advantages of nuclear vs. fossil-fueled electric generation, given the circumstances in question. On the other hand, would the cost of abandoning a 90 percent completed $300 million nuclear plant overwhelm any conceivable (non-radiological) environmental argument leveled against its operation? Perhaps the court had this situation in mind when it suggested the possibility of temporarily suspending plant construction pending the formulation of acceptable environmental impact assessments.

However, except for partial suspension of construction in a few cases—largely involving unresolved environmental questions regarding transmission lines—the AEC does not appear to be insisting on a plant construction moratorium. Thus, so far as the Calvert Cliffs nuclear plant is concerned, in November the Commission ruled that, pending the full-scale environmental review required by the court decision, construction could proceed. The AEC noted that continued construction would have minimal adverse environmental impact, while, in the light of past sunk costs, stoppage would be very expensive.

The Calvert Cliffs ruling may nonetheless turn out to be a truly landmark judicial decision in interpretation of legislative intent and public responsibility under the National Environmental Policy Act.



"THE RECYCLING SHELL GAME"

RECYCLING has become fashionable. During the past year "recycling centers" have sprung up around the country. The citizen can leave his newspapers, bottles, or aluminum cans for reprocessing and carry away a warm glow that he has struck a blow for ecology. Meanwhile, numerous bills have been introduced in state legislatures and local governmental bodies to ban the use of nonreturnable containers—a reflection of the same interest in encouraging reuse.

The private sector also has responded. The aluminum industry has sponsored the collection of cans, for example, and the onetime junk dealer has been upgraded to a secondary materials handler. Other firms far removed from the generation of solid wastes have sought to capitalize on the public concern by marketing products labelled as using recycled materials. The best opportunity has been in paper products where everything from Christmas cards to toilet paper may be advertised as made from recycled material.

All in all, the private efforts to profit from the public's passion for recycling are harmless and may even do some good. However, things are not always what they seem, and the net effect of this fad may be rather small.

No private firm uses recycled

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materials out of altruism—their use has to be profitable. Where it has been profitable, we have already done a good bit of recycling. Quite possibly from the standpoint of social costs we should do more, but unless such costs become reflected in private costs, the businessman is unlikely to seriously alter his material inputs.

Three assumptions appear to underlie the public interest in greater recycling. The first is that recycling makes use of materials not previously utilized. The second is that such use results in a net decrease in residuals, thereby improving the environment. Finally, it is assumed that the recycling of materials is less damaging to the environment than the processing of other materials for which they substitute. All of these assumptions can be challenged.

The paper industry provides a good illustration of some of the issues. Paper can be made from virgin wood, from residues from wood products industries such as sawmills, or from paper residuals. The choice between them is largely a matter of relative costs to the paper mill.

Even before the current interest in recycling, wood products residues were a growing source of material for paper production—as much as 70 percent of the input in the Pacific Northwest and nearly 20 percent in the Southeast. Such residues have become economically attractive as the cost of pulp has risen. Also, the use of wood products residues in paper making has been accelerated by air pollution controls that have made it costly to dispose of the residues by burning. Thus, use of this material was already underway in response to basic economic factors, and environmental controls on burning have only speeded it up.

Another major input to paper mills has been converting residuals —the unusable materials that result from transforming a jumbo roll of paper into paper products such as folding boxes, napkins, or typing paper. Anywhere from 2 to 20 percent of the original material is scrap in these processes. It becomes a very desirable input to paper mills because it is homogeneous, usually uncontaminated, and concentrated in a single location. Most of these converting residuals have been used for many years; in 1969 about 4 million tons of the 5 million generated were used.

Thus, both for wood products residues and converting residuals, much of the former and most of the latter materials were already being used in response to existing cost relationships. They were not burdening the environment. However, pollution controls limiting burning probably have stimulated greater reuse and thereby eased the solid waste management problem to a small degree.

Most attention has focused on paper discarded by the final user, the daily newspaper, for example. Only about 15–20 percent of these user residuals appear to be recycled at present. They are a difficult problem for waste management, and an increase in their reuse offers a real opportunity for reducing the costs of managing our solid wastes.

Would their use (which would reduce the amount of new pulp that we must produce) spare the environment? It depends. Paper residuals, like basic raw materials, require processing, and new residuals are generated in the course of processing. Whether the latter are less damaging than those generated by the use of virgin material depends on the characteristics of the corresponding residuals. For example, if 100 percent wastepaper is used to make a paper product, the result would be a substantially greater load of dissolved and suspended solids than would be generated by the kraft process using new material. On the other hand, the kraft process generates gaseous emissions that do not occur in wastepaper processing. Which kind of damage we are prepared to accept and the costs entailed by environmental protection will vary with the particular situation.

Not all types of paper products can be produced from paper residuals—the input components required for computer cards are different from those needed for newsprint. In other cases, greater use could be made of wastepaper if product specifications such as brightness were less stringent. In fact, product specifications, whether using new or recycled materials, may greatly affect the amount of residuals generated. A brown paper towel requires no bleaching (an environmentally burdensome process) while white paper must be bleached.

Public-spirited solid waste collection programs are not to be denigrated. They may have the advantage of educating the citizen against dispersal of trash (a great esthetic improvement), and they concentrate and classify materials so that more of them can be reused. This worthy urge may make us overly susceptible to the pitchmen for recycled merchandise, however. Our new environmental consciousness has created a market for products using recycled materials, and quite a few firms present themselves as deserving patronage for this reason. In truth, many of them are only using the same materials and processes that they have always used. What is new is often only the label.

Hurricane Modification

FOR SEVERAL YEARS government meteorologists in cooperation with the Defense Department have made a series of hurricane modification experiments under the rather evocative name *Stormfury*. Some of the experiments have been conducted by means of computers using mathematical models of how these major storms behave; others through work on actual hurricanes by seeding them with silver iodide from aircraft.

Last September, in the most recent of these experiments, rain-belt clouds 70 to 100 miles from the center of hurricane Ginger were seeded. After these operations R.

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Cecil Gentry, who is director of Project Stormfury, said, "Observations made reveal that there were changes in the clouds that were seeded and in the structure of the storm." This was only the latest in a series of experimental results that suggest that wind and rain intensity in hurricanes can be altered quite substantially by seeding. There is now talk among some scientists that hurricane modification is a reality and that operational programs can be initiated.

The benefits from hurricane modification could be large. Each year these storms take a number of lives in the United States and cause many millions of dollars worth of damages by wind and flood. Typhoons, their counterparts in the Pacific, are even more destructive of human life.

It can be anticipated that once the efficacy of modification has been demonstrated, pressures for launching operational programs will be immense. When a major storm is bearing down upon a heavily settled land area, it is easy to imagine how difficult it would be for scientists and technicians in a government agency to resist pressures from the Congress and the public to do what they can to mitigate damages.

PERHAPS A PROGRAM of hurricane modification would indeed be a boon to the nation. But there is concern that such a program may be launched before all its ramifications are properly examined. Many are not now well understood. Some portions of the United States are substantially dependent on hurricanes for rainfall. In this connection, would modification be a favorable or an unfavorable development? We do not know. It is possible that more gentle and useful rain would fall over large areas as a result of the modification. On the other hand, the reduction in the storm intensity might reduce its capacity to penetrate inland areas. Other ecological effects, such as those on the morphology of streams and estuary areas, have not been carefully examined. Stream systems have evolved in the context of highly variable rainfall and streamflow, including occasional high flood levels. Clearly, some examination of the implications of substantially altering this regimen is needed.

Moreover, it is not certain that hurricane modification would reduce damage or loss of life. Since the mid-1930s the Corps of Engineers has been vigorously engaged in constructing reservoirs and other facilities to control flood damage. As the studies of geographer Gilbert White and his associates have shown, we have at the same time seen no decline in damage but, if anything, increasing amounts of overall destruction. This results from heavier occupation of flood plains, often based on misunderstanding of how much protection has actually been provided. White has long advocated a program of zoning and flood information, which has now, to a small extent, come into practice. Based on this experience, it is fair to speculate that a major result of our ability to modify hurricanes will be a rapidly expanding occupation of hazardous sites in the coastal and river basin areas affected by hurricanes. Unless controls on land use are imposed simultaneously, it could well be that modification would not reduce the amount of damage or loss of life.

Clearly, there is an urgent need to examine the hurricane modification program in a much broader context than has so far been done. Up to now, and perhaps quite properly, the focus has been exclusively on the issue, "Can we modify these huge storms?" Now we must turn to the equally difficult, if not more difficult, question, "If we can modify them, should we?"

Effluent Taxes and Regulation

PRESENT GOVERNMENT programs to combat environmental pollution depend heavily on the use of enforcement actions against individual sources of emission, provision of subsidies for treatment plant construction, and to some extent efforts to apply standards to individual sources of emissions. This approach has been characteristic of all levels of government, and the effectiveness with which it has been implemented is highly variable. That this is still the main thrust of national policy was underlined by the water quality bill passed by the Senate in November 1971. It emphasizes each of these elements and sets forth an ambitious goal of ending all discharges to watercourses by 1985.

Many economists have long favored an alternative approach, which would rely much more heavily on the use of taxes or charges on effluents to improve environmental quality in a more efficient and probably more equitable manner. In principle, such taxes or charges should reflect the external or social cost imposed on the larger economy by the particular waste discharged. The tax would make this cost internal to the firm or municipality and provide it with incentive to reduce its waste discharge by any means that would cost less than the tax. This "internalization" of social cost would not only reduce waste discharges to the environment but cause social costs of production to be reflected in the price of products, thereby affecting the quantity demanded by consumers.

In practice, a charge or tax on pollution would probably have to be uniform within zones in a re-

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gion, for a region as a whole, or even on a national level. Such charges would have to reflect an estimate of average damages or be imposed at a level that would permit an ambient or environmental standard or objective to be obtained —for example, a certain number of parts per million of dissolved oxygen in a water body.

Such a charge system would have desirable effects, even though it did not mirror exactly the social costs of production. For example, if some polluters could reduce their emissions cheaply, it would favor their doing so, thereby automatically allocating more of the assimilative capacity of the environment to those sources which find it most expensive to control their effluents. This means that whatever environmental standard is specified could be achieved at something like the lowest cost to society; various studies have shown that this cost can be quite a lot lower than that imposed by the introduction of uniform emission standards. Furthermore, effluent charges would cause at least a rough approximation of the social costs of production to be reflected in product prices. Finally, they would provide a strong incentive to undertake research and development activities.

In the case of water, economic studies have also shown that there are many alternatives to the reduction of emissions at individual points of discharge if viewed from the standpoint of an integrated river basin. The waste-assimilative capacity of the river can be improved through low flow augmentation and the introduction of air or oxygen to the water course. Additionally, since there are scale economies in treatment, it is often efficient to combine more than one source of waste discharge in treating waste prior to discharge. Operations on such a basis can greatly reduce the costs of achieving specified levels of water quality. This has caused some economists to argue strongly in favor of the development of regional river basin institutions for the management of water quality along with the imposition of effluent charges. The problem of regional institution building is largely neglected in our present national program.

UNTIL RECENTLY, the case for effluent charges has been argued primarily by economists. In the last year, however, several politically important conservation groups, which previously had opposed the charges approach, have stepped solidly behind the effort to levy pollution charges or taxes. In July 1971 representatives of the Sierra Club, the National Wildlife Federation, Friends of the Earth, and the Audubon Society testified before a congressional committee in behalf of the pollution tax strategy. The change in position results mostly from their conclusion that the conventional enforcement-subsidy strategy is not working. This new support for effluent charges is of considerable political importance, and on the strength of it Senator Proxmire introduced a bill called the Regional Water Quality Act of 1971. This revised version of a bill introduced by the senator several years ago would levy a national effluent charge on certain waterborne waste and would stimulate the creation of river basin agencies to manage water quality on an integrated regional basis.

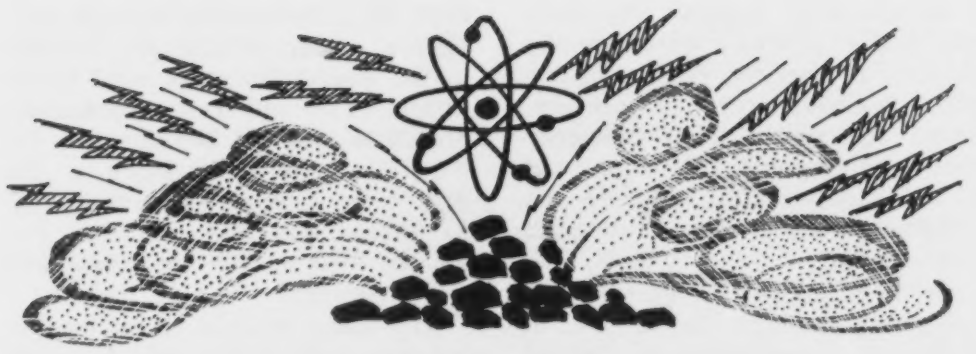
Another move on the part of the conservationist groups is the formation of the Coalition To Tax Pollution. So far, the Coalition's efforts have been primarily to promote national legislation to tax sulfur emissions.

Interest in an effluent charge or tax approach to improving water quality has developed in several states. Vermont has enacted (but delayed implementation for a year) a program to charge waste dischargers a fee until they come into compliance with emission standards. This essentially uses the charges device as an enforcement tool. The main purpose is to remove the economic incentive for delaying compliance, which is inherent in the standard enforcement approach. More nearly pure "effluent charge" strategies on water pollution have been or are being considered in several other states, including Maine, Wisconsin, and Illinois.

Of equal interest is the support for effluent charges from the President and his Council on Environmental Quality. In their *Second Annual Report,* the Council says, "With little doubt, a well-constructed charge system tied to the amount and type of pollutants would quickly curb waste discharges . . . . Pollution charges would provide a strong abatement incentive and would tie environmental costs to the processes that generate the pollution." The *Report* goes on to advocate a combination of direct regulation and charges. The Administration has proposed taxes on lead and on sulfur oxide emissions which, the *Report* contends, show the way toward a proper strategy for combining both approaches. Regulatory authority, the *Report* says, can be used to establish ambient standards and back up enforcement while emission charges or taxes provide the economic incentive to achieve these standards.

Discussion has turned away from rather abstract justifications of different approaches to the question of how various approaches can be implemented and optimally combined; this was highlighted in October, by a conference of the Council on Law-Related Problems, during which implementation questions were discussed in detail.

The use of effluent charges and taxes is still a marginal part of the effort to develop an effective public policy with respect to environmental pollution. However, the realization is growing that environmental problems to a large extent are a product of the failure of our market system to internalize social costs. Also, there is a spreading conviction that our traditional enforcement processes more often than not have been ineffective. These developments have given new significance to discussion of the role of economic incentives in environmental quality management. The main issues in current discussion concern (1) how to determine the proper basis for levying taxes and charges, (2) the desirability of effluent taxes and charges at the national level, and (3) their relation to regional environment schemes for enforcement and regulation. These issues are coming to a focus in efforts to hammer out real legislation as characterized by the Proxmire bill and efforts in several states.



The President's Energy Message

IN JUNE 1971, President Nixon transmitted a special message to Congress on U.S. energy problems. This is the first occasion on which a Chief Executive has addressed himself solely to the subject of energy in this public fashion. By adding his own concern to what has become an almost endless national debate, the President's message kept the "energy crisis" a live and continuing national issue.

The message noted that, historically, energy costs have fallen relative to the overall price level, a fact which may have contributed to the rapid growth of energy demand in recent years. Short supplies of environmentally acceptable fuels—such as low-sulfur oil and natural gas—as well as delays in power plant construction have caused continued anxiety about possible supply tightness in the years ahead.

The President's message touched upon each of these matters as well as on the long-run prospects for economical exploitation of the energy resources that most people agree exist in abundance onshore and offshore. However, the message stressed technological options rather than economic forces and policies, which also could contribute toward the solution of energy problems. Thus, the President for the most part avoided discussion of oil import policy, regulation of natural gas price, and taxation and leasing terms as devices for affecting the availability of fuels; and he did not deal with such economic measures as price disincentives, which appeal to many as a means of restraining energy demand. The President may well have sensed the vast ignorance and uncertainty that still exist in the latter area.

The message called for a number of measures that should result in more sensible energy-use decisions, e.g., federal power plant siting legislation (under congressional consideration late in the year) designed to rationalize what is presently a time-consuming process diffused among innumerable layers of local and state authorities; legislation providing an incentive charge to reduce sulfur oxide emissions; departmental reorganization, which would unite within a new department of natural resources all import energy resource development programs except possibly some aspects of nuclear power development; and new efforts to economize on energy use through strengthened FHA insulation standards and consumer education programs. The President also called for accelerated leasing of federal onshore and offshore lands to spur exploration for oil and gas, and he ordered the Secretary of the Interior to expedite the development of an oil shale leasing program. In all these proposals, the President's language reflected awareness of the environmental impacts and risks attached.

The major thrust of the message was nonetheless technological, as shown by the following measures:

- Stepped-up federal support for development of the breeder reactor, including an increased share in the government's contribution to construction of a demonstration plant by 1980.
- Some expansion in the modest federal assistance to make the conversion of coal into high-Btu gas commercially feasible.
- A significant jump in funds for sulfur oxide control technology; again, however, the base amount of support has been quite small.
- A pledge of continued government assistance for a variety of R&D efforts, including coal liquefaction, magneto-hydrodynamic power cycles, and controlled thermonuclear fusion.

Since the breeder reactor and coal gasification program were clearly given central emphasis in the President's message, a closer look at the economic and technological problems connected with these important efforts (each of which could become still more important if one or the other did not succeed) seems worthwhile.

BREEDER REACTORS. Breeder reactors are capable of extracting from 30 to 50 times as much energy from a pound of natural uranium as current light-water reactor types. They thus promise substantially lower fuel costs than light-water reactors and a greatly expanded availability of fuel. However, breeder reactors are inherently more complex than light-water reactors, are expected to have higher capital costs, and present new environmental problems.

The technical feasibility of breeder reactors has been established. The primary questions now center around commercialization and environmental impacts. The next step in commercialization involves moving from small-scale prototypes and tests to units of several hundred electrical megawatts, which should be large enough to demonstrate that commercial size units in the 1,000-mw range can be successfully operated and should provide some indication of the probable cost of power from such units. Construction of a demonstration plant will involve numerous engineering problems, including large-scale routine handling of liquid sodium. There seems to be little real doubt that these engineering problems can be solved, but they must be solved in a manner that will not lead to prohibitive costs. It appears that the capital costs of a breeder reactor must not exceed those of light-water reactors by more than about 25 percent in the 1990s if the expected lower fuel costs of the breeder are not to be offset by its

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higher capital costs. Further development of plutonium fuel technology and management is also necessary in order to assure economic operation.

No current estimates of power costs from breeder reactors can be regarded with much confidence. Breeder cost estimates are generally derived from light-water reactor cost estimates, directly or indirectly. Although the costing methods are crude, they are a necessary justification for breeder research and development, for it makes sense to develop breeders only if their costs can be reduced below those of light-water reactors. The possibility of rising uranium costs, and therefore of light-water reactor fuel costs, is frequently relied on to increase the justification of breeder development. The cost of power from light-water reactors, currently estimated at about 8.6 mills per kilowatt-hour, will increase about 0.06 mills per kilowatt-hour for each $1 per pound the price of uranium oxide increases above the current price of $6 to $7 per pound. Such increases would make scant difference to the cost of power from a breeder reactor.

Enthusiasm for the breeder on the part of electric utilities and major reactor manufacturers has been lagging. This is due in part to sheer preoccupation with getting light-water reactors on the line in time to meet utility loads and also to a growing realization of the major problems involved in the commercial adoption of a new reactor system. Problems of licensing, construction, environment, and safety with light-water reactors all have proved greater than were envisioned a few years ago. Although something may be learned from the light-water reactor experience, some of the same sort of problems seem inevitable in the introduction of breeder reactors.

Another factor lessening the urgency of breeder reactor development has been growing confidence that low-cost uranium supplies are much more abundant than was previously estimated by the Atomic Energy Commission. Moreover, it now appears that high-temperature gas-cooled reactors will capture part of the reactor market. These reactors rely in part on thorium (which is in abundant supply) for their fuel, and thus will reduce demand for natural uranium. High-temperature gas-cooled reactors are expected to achieve heat efficiency levels comparable to those of breeder reactors, thus reducing one environmental incentive for breeder development.

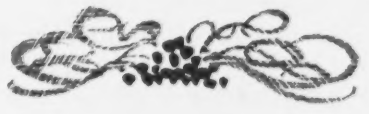
As noted above, the President in his energy message announced an additional commitment of federal funds to the breeder reactor demonstration program. The substantive reason for the additional federal commitment is unclear, although it was evident that the time had come either to move ahead with the breeder demonstration program or to cut it back until the benefits of breeders could be more clearly identified.

A substantial portion of the cost of the first breeder demonstration plant, estimated to cost as much as $600 million, is to be supplied by electric utilities and reactor manufacturers, with the government's share currently set at about $130 million. Fund raising among electric utilities is reportedly going well. The President announced a second demonstration plant recently, but its timing and financing are uncertain. AEC's plans call for having the breeder developed in the mid-1980s to the point where it can be ordered on a commercial basis from reactor manufacturers.

The demonstration program faces serious environmental hurdles. The AEC has not yet agreed to prepare an environmental statement for the breeder program of the type required under the National Environmental Policy Act. The AEC maintains that only an environmental statement on the demonstration plant, not on the program, is required. This position is being challenged in the courts. However, the generally increased environmental concern of AEC, at least partially as a result of the Calvert Cliffs decision (see elsewhere in this issue), could bring a greater willingness to prepare an environmental statement.

COAL GASIFICATION. The idea of producing gas from coal is not new; in fact, so-called producer gas plants were in widespread use in the United States by 1875. However, the development of large supplies of cheap natural gas resulted in the abandonment of coal gasification. The old coal gasification processes will not be adequate for the future; they produced a gas with a low heating value compared to natural gas and one that frequently had a high tar, soot, and sulfur content.

The Lurgi process of gasification has been used in Germany for some years and is commercially available. However, some question arises as to how well the process will work with American coals, which have a much greater caking tendency than European coals. The Lurgi process is felt by many to be economically



attractive in the United States only in special circumstances. The El Paso Natural Gas Company has announced plans to build a coal gasification plant based on the Lurgi process in the San Juan Basin of New Mexico. It is designed to produce 250 million cubic feet (equal to about 0.5 percent of current U.S. gas consumption) of gas per day from coal at a cost of about $250 million. The FMC Corporation has also announced plans for a similar plant, but is seeking cooperation from other companies in a process improvement effort before starting construction.

In the belief that more advanced technology is essential if coal gasification is to play a significant role in the nation's gas supply, the Department of the Interior and the American Gas Association have announced a joint research and development effort to further develop and demonstrate advanced coal gasification technology. The National Academy of Engineering has conducted a review of coal gasification technology at the request of the government. It appears that the National Academy will recommend that four gasification processes be carried through at least the pilot plant stage in order better to determine the technical and economic characteristics of the alternate processes.

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Although estimates of the cost of pipeline quality gas from large-scale coal gasification plants have ranged from 40 to 60 cents per thousand cubic feet (mcf), it appears that estimates based on current studies of the technology and cost factors will range from 80 cents to $1.20 per mcf. This may be compared with a current U.S. average wellhead price for natural gas of less than 20 cents per mcf and recently set wellhead prices for new gas in the 25 cents per mcf range.

It is not clear whether the production of synthetic gas will be subject to Federal Power Commission (FPC) regulation. Whether or not the price of synthetic gas at the plant is controlled by the FPC, state and federal regulatory authorities face a real dilemma: they would be allowing gas priced at around $1.00 per mcf to be supplied to customers whose economic interests they are supposed to protect, while effectively precluding the production of natural gas, which could be produced at prices between 25 cents and $1.00 per mcf. Resource estimates indicate a substantial amount of gas that could be found and produced in this price range.

Production of gas from coal at prices substantially above the field price of natural gas also raises questions of energy pricing policies. Gas from coal will apparently be commingled with natural gas by local utilities and sold at average prices. Thus, for moderate amounts of such production the average price will be changed only a small amount and shared by many customers. While this has some merit from an equity viewpoint, it is likely to result in the incremental gas being sold at well below cost, thus distorting the response of demand as compared to the situation in which incremental users must pay incremental costs.

If the price of manufactured gas is not regulated, and if such gas is priced to the consumer on an average basis, there could be a tendency for companies, even oil and gas producing companies, to prefer to make the large investment required in coal gasification facilities in order to earn an unregulated rate of return on it rather than fight with the FPC over natural gas prices.

OPEC VICTORIES IN 1971

OIL EXPORTING countries who are members of the Organization of Petroleum Exporting Countries (OPEC) scored a major success in 1971. In negotiations with the major international oil producing companies operating within their lands, the member states of OPEC succeeded in increasing both the nominal (or posted price of oil from North Africa and the Persian Gulf and the rate at which company profits on that oil are taxed.

OPEC, whose membership now includes all of the world's important oil exporting countries, was organized in 1960. Although not itself a body that bargains collectively for the exporting countries, it has succeeded in promoting the interests of the separate countries through achieving parallel lines of national policy.

Earlier, OPEC had been instrumental in halting the decline in posted prices that occurred during the 1950s, and in protecting member countries' return per barrel of oil. OPEC did this during the 1960s by tying the return per barrel to the posted price, which at its insistence was maintained at a fixed rate, despite the continued downward trend in the actual market price of crude oil.

In view of the continued decline in market price, the earlier OPEC success was thought by many to be somewhat shaky. Exporting countries claimed as their share of the revenues from oil sales a 50 percent tax on profits imputed to the companies at the fixed post price. Their take, although called a tax on income, became in effect a fixed charge per barrel (80–90 cents at the Persian Gulf in the late 1960s). In the face of declining market price and a fixed per-barrel charge, the companies were earning progressively less per barrel. This led to speculation that eventually the producer countries would have to bear a portion of the decline in actual revenue per barrel.

Instead, the negotiations of the past year resulted in an increase in the producer countries' per-barrel take by about 40 cents or more at Persian Gulf ports (as of June 1971), with an escalation clause that will bring about annual increases totaling more than 20 cents over the next five years—the period of the agreement signed at Teheran in early 1971. North African increases are larger; over the same period Libya will gain about 80 cents per barrel. This is in part accounted for by a transportation premium (due to proximity to Europe) which will decline as tanker rates from the Middle East to Europe ease. Oil exporting countries in other parts of the world also increased their take by one device or another (in the Venezuelan case, by unilateral action).

Why this unexpected turn in what appeared to be an evolutionary decline in world oil prices? A contributing cause was a unique set of circumstances restricting the supply of oil at the time of the Libyan negotiations. The disruption of the Trans-Arabian Pipeline (Tapline) in the spring of 1970 by the Syrians, followed by production cutbacks (in the name of conservation) imposed upon most of the companies operating in Libya by that country's government were major factors. The accompanying threat of an embargo on shipments of Libya's low-sulfur oil at a time when Europe was increasingly concerned about air pollution added to Libya's bargaining power. While these events apparently were not carefully structured by OPEC, they were not acts of God either. The exporters turned them to account. It appears that Western observers of the oil trade may have underestimated the cohesiveness and boldness of the exporting countries.

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In late 1970 the oil companies agreed to a rise in the posted price of Libyan oil and to a higher tax rate on imputed profits—a double bite. The Libyan success was followed by a demand for improved posted price and tax treatment by a united front of Persian Gulf producers, again accompanied by the threat of a concerted embargo on oil shipments. Following the Persian Gulf settlement in February 1971 came another round with the Libyans, completed in the early spring of 1971, which gave them a still more favorable agreement.

What the events of 1971 portend for the future is not altogether clear. Has the buyers' market in world oil been replaced by a sellers' market? It would be difficult to reach such a conclusion on the basis of the vast amounts of low-cost oil reserves in the Middle East, North Africa, and other parts of the world, with more continuing to be found. Nevertheless, the oil companies, unable to resist the whipsaw tactics of producer countries and unwilling to see their earnings further eroded, have begun to pass the increased charges through to their customers. Is it realistic to expect the exporting countries, orchestrated by OPEC, to succeed as a producers' cartel in exacting ever higher prices from the importing countries through the use of the international oil companies as their vehicle? It is equally difficult to reach this conclusion in view of the persistent failures of the producing countries to reach agreement in the past on production controls that would be necessary to support an enduring cartel.

The events of 1971 are probably best viewed as an episode made possible through shrewd producer country bargaining under a unique set of circumstances. Those who were victimized through higher prices—the importing countries—will want to give serious attention to methods of preventing similar episodes in the future. As long as they are heavily dependent on imported oil from OPEC countries, neutralization of the embargo threat as a bargaining weapon through substantial stockpiling of crude oil and plans for rationing oil products in possible emergencies will need to receive serious attention. For the longer run, plans to lessen dependence on OPEC oil, through various measures, will receive impetus. The OPEC countries, triumphant in 1971, are now setting their sights on another target. Higher per-barrel earnings is but one of two major objectives that have received serious attention in OPEC councils in recent years. The other is eventual majority ownership in the major concessions—not through acquiring equity shares in the existing concession-holding companies, but through the setting up of new companies in which the foreign concessionaires and national firms of the producing countries would both hold an interest. In the autumn of 1971, the rough outlines of an OPEC blueprint for what is euphemistically referred to as "participation" in the major concessions began to emerge.

All past conflicts involving the international oil companies, the producer government, and the importing countries are likely to pale in comparison with the difficulties that lie ahead. The international oil trade may now be entering the most unpredictable period in its history.

EXPROPRIATING THE FOREIGNER

EXPROPRIATION of foreign-owned property nearly always strains relations between the countries concerned, and in the past was often the occasion for forcible intervention. By now, the right of a country to take foreign-owned property is widely accepted and the dispute centers on compensation. This subject has been dramatized during the past year by the Chilean seizure of copper mines in that country that were owned by U.S. companies. While this is the most notable recent event of its kind, many other expropriations have occurred in Chile and elsewhere in the years following World War II. Expropriation, of course, is only one of a range of possibilities open to the less-developed countries as they grope for a way of improving their returns from their resource industries. Another route, taken by petroleum exporting countries, is reported elsewhere in this issue.

Expropriations of one sort or another have occurred throughout the postwar years. Sometimes they have amounted to confiscations, with very little compensation paid. In recent years Zambia negotiated the transfer of a majority interest in its copper mines. Peru expropriated large agricultural properties (some of them foreign-owned) and seized the International Petroleum Corporation (IPC) after one of the more extended disputes of this kind. Chile has taken many foreign properties over the past year in addition to the copper mines.

When a government takes property it is almost certain to do so within the terms of its own laws. Whether this also conforms to international law becomes a very involved question. A UN General Assembly resolution of 1962 espoused three criteria to govern compensation when foreign-owned resource industries are taken, namely that the compensation should be (1) appropriate; (2) in accordance with rules in force in the State taking such measures in the exercise of its sovereignty; and (3) in accordance with international law.

But the adequacy of compensation may be judged by different standards. Economists probably incline toward market value as the appropriate one (and this is the thrust of international law) but even this is not clear cut. Stock prices are affected by the very prospect of expropriation. Use book value? It does not reflect price changes, the success of investments made, or the value of the management team. Moreover, since market value reflects profit expectations, the government can affect these through taxes, harassment, renegotiation of contracts under duress, and in myriad other ways so as to reduce the value of the enterprise it seeks to acquire.

Some of this can be illustrated by the Chilean copper expropriation.

The value of these properties to their owners was affected for many years by a succession of tax measures and exchange regulations that increased the Chilean share of mine revenues. Partial transfer of ownership occurred in 1967 and 1969 under agreements made with the Frei government that plainly were influenced by this earlier history. These agreements, while complex, provided the companies with assurances on taxes in return for expansion of the industry and arrangement of the financing required for expansion.

When President Allende came to power in late 1970, a constitutional amendment was proposed to permit the complete expropriation of the large copper properties. It passed unanimously. Included was a provision permitting the deduction of any "excess profits" made by the companies since 1955 from the compensation due. In October 1971 the Chilean official responsible determined that excess profits were so great that only in the case of two new mines was any compensation due, as indicated in the following table released by the Chilean government:

Mining company	*Book value*	*Deductions*	*Excess profits since 1955*	*Balance to be compensated*
	(..... *millions of U.S. dollars* .....)			
Chuquicamata	241	18	300	−77
El Salvador	68	6	64	−2
Exótica	15	5	0	+10
El Teniente	318	219	410	−311
Andina	20	2	0	+18

These determinations were under appeal at the time of writing.

What do the Chileans gain by the expropriation? Clearly they gain valuable investments at little cost if present indications prevail. However, over the longer term their gain will depend on their success in operating the mines and on the kind of retaliation they encounter. While elements of national pride are important, and ideological and emotional objections to the U.S. government and to U.S. business are satisfied by the action, Chileans of all classes are not unaware of the problems created.

At least initially, the mines do not seem to be a source of great profit. Copper prices are lower than in the last few years and Chilean production costs appear to have soared. Many skilled supervisory employees (perhaps a third or more of the total, including many at the upper levels) have left the mines. Costs of production at one major mine are said to have more than doubled in the nine months following take-over, and the miners are seeking a generous pay increase. Longer term, there is a question of whether a government enterprise in this case will be able to summon the capital and management resources to find new deposits and to develop new mines.

POSSIBILITIES for retaliation do exist. The United States can stop Export-Import Bank loans, curtail aid, influence the availability of World Bank financing, and is required by law to vote against (and thereby block) low-interest Inter-American Development Bank (IDB) loans. However, the Chileans may not consider such action very probable or that it will be very long-lasting. The United States strained to avoid a formal aid cut-off when Peru acted against the IPC and has behaved with restraint in the case of Bolivia. Private capital flows also may be affected.

The policy of the U.S. government is that it will not oppose expropriations, but will seek prompt compensation in accordance with the standards of international law. However, this poses certain difficult policy choices for the United States. The law now provides for three types of mandatory retaliation for failure to pay prompt compensation. Under the Hickenlooper amendment, a determination that inadequate compensation has been paid requires that foreign aid be refused the offending country until a proper settlement is made. Also the U.S. representative on the IDB is required to vote against approval of soft loans from that organization to the offending country. Many persons, both inside and outside the Administration, deplore the lack of flexibility in these mandatory measures since it is difficult to gauge the retaliation to the magnitude of the offense or to withhold action where it may only aggravate the situation. Another form of pressure available is the U.S. sugar quota, which is of great value to some countries. The President has authority to suspend sugar quotas in retaliation if he chooses, or to tax sugar imports from the offending country.

It is unclear whether policies of firmness or retaliation, mandatory or not, will improve the chances of securing compensation. In situations where feelings have been exacerbated by ideological or nationalistic differences, a policy of retaliation may simply result in still more confiscations of the property of U.S. firms.

The U.S. government has sought to encourage private investment in less-developed countries by offering insurance against the political risks involved. Of the $3.8 billion of insurance against expropriation in force in March 1971, $2.2 billion was for investments in Latin America (and Chile led the list of all countries). However, the existence of insurance may make the investor less cautious and at the same time may cause the expropriating country to exercise less restraint in acting against foreign firms. Meanwhile, U.S. taxpayers may have to make good the private losses the government has insured.

For investments already in place, some of them encouraged by government policy, the U.S. government seems obligated to defend the interests of its nationals in accordance with international law, even though what it can do may be limited. For new investments, perhaps both the investors and host countries should be put on notice that they must themselves evaluate the advantages and risks of their actions more carefully without the assurance that the U.S. government will pick up the tab. Host countries should be made aware of the possible costs of worsening their climate for private investment, and investors in turn should be more careful about their commitments and perhaps more accommodating to the needs of host countries.

INVERTED POWER RATES?

A PERSISTENT REFRAIN among environmentalists is that we must reduce our demand for electricity in order to moderate the environmental consequences of its production and distribution. In many actions they have attacked the utility industry for its promotional practices, ranging from advertising to pricing—especially the volume discount offered on price per kilowatt-hour to large users. With the environmental concern reinforced by power shortages over the past year or two, the regulatory authorities also have begun to look at means of restraining demand. For what may be the first time, these considerations appear to have influenced an electricity rate decision in 1971. The New York Public Service Commission required Consolidated Edison to raise its rates to large industrial users by a greater percentage than for small industrial users in New York City. Other commissions initiated studies or issued warnings during the year but have not changed rate structures.

Heretofore, electricity rate structures have generally featured per kilowatt-hour rates that decline as monthly consumption increases. The implied criterion is that there are economies of scale in electricity production and distribution, which this rate structure reflects. The cost standard is not strictly adhered to, however, for cost differences between peak and off-peak power rarely are recognized in rate structures; the far more costly peak power generally is sold at the same rate as off-peak power.

However, if pricing is intended to restrain consumption, electricity rates need not reflect costs of service to different categories of customers at all (so long as total revenues are sufficient to match costs); the way is cleared to penalize large users by higher rates, rather than giving them volume discounts. This idea, called an inverted rate structure, has found a number of supporters. It also raises a number of questions.

One major issue is whether inverted rates will be effective in reducing demand. Recent studies indicate that over time the responsiveness of demand to price changes may be greater than once believed. This may be due in part to the increased role of electric home heating, which competes with oil and gas. Air conditioning and other uses also may be price elastic over the longer term, though further analysis is required to determine the extent.

OPPONENTS of inverted rates tend to focus on industrial users and on shorter-run effects in arguing that electricity consumption will not be responsive to moderate price changes. For industrial users, power cost is a small part of total costs in most cases, and they would be slow to reduce consumption. Where it is a larger component, they might be tempted simply to relocate elsewhere if rates became too high. Householders also might not reduce their consumption much, especially at peak periods. Moreover, increased consumption by small users might partially offset the decline by large users. Opponents also argue on equity grounds that inverted rates place an unfair burden on those who already have invested heavily in electric heating and appliances. This concern probably could be met by giving special consideration to such customers. A power system's capacity—and therefore some of its environmental consequences—must be built to satisfy peak demand. But inverted rates may not be very successful in restraining peak demand. People are unlikely to turn off their air conditioners on the hottest days in response to higher rates—more likely they will cut back during off-peak periods, thereby reducing the system's load factor and raising overall costs.

Even if consumption of electricity can be retarded by inverted rates, one must ask what becomes of the suppressed demand. It may simply be diverted to other forms of energy, in which case we must compare the relative damage to the environment of electricity and other energy forms. Or if rates are too high, large users might be tempted to generate their own electricity, even if less efficiently and at some environmental cost. Perhaps both of these diversions could be prevented by regulation or taxation, but, unless they are, the net environmental effect of inverting electricity rate structures becomes uncertain. Critics of rate inversion would argue that it is more sensible to deal directly with the environmental impact of each project and to impose direct charges against damaging pollutants rather than to rely on inverted rates to accomplish improvement indirectly.

Proponents of rate structure inversion have not dealt systematically with these considerations. The major element in their thinking is that many uses of electricity are needless luxuries, although they do not attempt to establish the case in careful detail. Their argument is simply that consumption must be limited and a change to inverted rates is in the right direction for restraining demand. Since pollution damage probably increases more than proportionally as consumption rises, the inverted rates are a kind of proxy for the pollution taxes we have failed to impose. Moreover, an inverted structure would not encourage use during peak periods as

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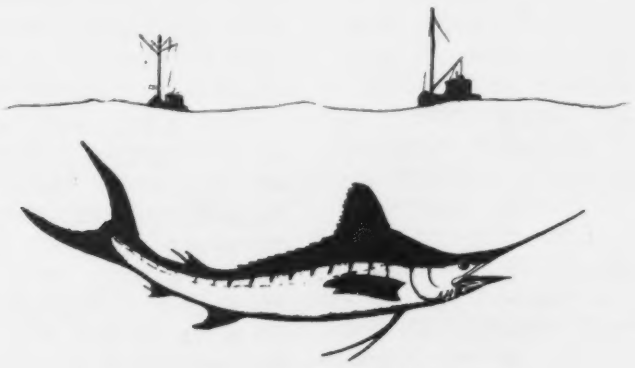
the present one does. Proponents also may argue that the change will have favorable income distribution effects, since smaller (poorer) users would pay less than larger (richer) ones. This proposition is a deceptive oversimplification, however, since large users include the New York subways (which serve the poor) and many single-meter apartment buildings where higher rates would be passed on in rental charges to poor tenants.

Economists tend to grow uncomfortable whenever price deviates too far from cost. There are real cost advantages to larger scale both in the production and distribution of electricity, and from the economists' standpoint it is appropriate that these be reflected in price. By the same token, the failure of existing structures to take into account the higher real cost of peak power is not defensible. While inverted rates might discourage some peak use, a more logical response would be to charge more to those actually using power during peak periods, leaving large off-peak users free to claim the cost advantages of large blocks of power. Moreover, many economists would feel that the income redistribution resulting from inverted rates, if a desired goal, might better be achieved in other ways. In general, it seems dubious practice to seek arbitrary restriction of demand. If the price of power is made high enough to correct the environmental costs of its production, then there is less basis for limiting power output. If, however, we become determined to ration electricity use, inverted rates will appeal as a means of equalizing distribution of the supply.



WHOSE FISH? WHOSE OCEAN?

REPEATED ABRASIVE encounters between American fishermen and Latin American governmental authorities over the past year, while meantime Russian trawlers work close in to our own shores, have made many Americans freshly aware of the law of the sea, even if most of us do no more than wonder whatever became of the three-mile limit.

It is appropriate that the overall question of jurisdiction over the sea should be dramatized by fishing disputes, for today these provide many of the thorniest problems. It was not always so. When in 1967 the United Nations began to examine the matter of the ocean's ownership, fisheries were excluded from the deliberations. Attention was concentrated on the seabed: how to control its military use and its oil and other minerals. Since then, many of the world's states have concluded that for them fisheries are of greater importance than other marine issues, and consequently it is expected that fishery problems will be an important feature of the Third UN Conference on the Law of the Sea, which is scheduled for 1973.

While such issues as rules governing offshore oil production, rights of military passage, ocean pollution, and the like attract the attention of some governments, not all are concerned with these matters. However, almost all coastal states engage in some fishing, using their own labor and vessels. Fishery interests are pervasive and, for the world as a whole, are a larger source of revenue than any other marine resource, including oil. Fishery problems are not only more important but more difficult. Problems of oil, for example, relate primarily to the continental margin and can be removed from the international arena by unilateral extension of exclusive zones. Problems of marine fisheries, however, cannot shed their international character because fish, being fugacious, have no respect for boundaries. Some of the more highly travelled species (salmon, tuna) range the ocean. Most stocks are not so broad ranging, but in their lateral movements along the shore they still may pass through the jurisdictions of several states. Thus for fisheries, international rules, at least on a regional basis, are required.

Fishery problems are aggravated by rapidly increasing competition for restricted supplies. From World War II until 1969 the catch grew at 6 percent per year, but for 1969 a decline was registered, and projections of the Food and Agriculture Organization indicate slower growth—down to about 2.3 percent per year. Most conventional species are subjected to extraordinary pressure and many are fished beyond the point of maximum sustainable yield. Rising demand coupled with limited stocks raises the value of fish and makes it profitable to continue fishing even when yields diminish. Thus, the capacity of the U.S. tuna fleet rose 75 percent in the last four years, and the world tonnage of large fishing vessels increased by one-eighth between 1969 and 1970.

Large fishing vessels can cause international disharmony, since they can travel thousands of miles to fish off the shores of foreign states in waters once reserved to local fishermen. In one season they can clean out a local stock and move on to other waters, leaving little behind them.

In 1958 only 6 states claimed exclusive fishing limits of more than 12 miles out from shore. Now the number is 16, of which 10 extend their claim to 200 miles. In asserting its claim, Ecuador collected $1.5 million from U.S. tuna fishermen apprehended within Ecuadori-

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an-imposed limits during the first few months of 1971.

Regardless of where exclusive limits are drawn, increasing pressures on fish stocks require new institutions and management techniques. Past conservation regulations have only resulted in lower catches per unit of effort. For example, in the past 25 years the catch of Alaskan salmon declined by one-third while the number of fishermen doubled.

If yields are to be maintained and costs minimized, some agency must control the amount of fishing effort. This raises difficult questions of how the sea's wealth in fisheries is to be divided. One solution might be to view ocean fish as a "common heritage" which, under suitable institutional arrangements, would be used to generate economic revenues for all. However desirable this might be from the standpoint of efficiency and equity, it would mean that fishermen—many of them very poor—would have to pay for their present free right to fish.

THE UNITED STATES proposed a draft treaty, including provisions relating to fishing, at a meeting of the UN Seabed Committee in August. With regard to the struggle between coastal states and distant water fishing states, the U.S. proposal attempts to give everything to the coastal states while taking nothing from the foreigners. Thus, it would allocate to the coastal state that percentage of the allowable catch which can be harvested by it in adjacent waters while assuring foreigners that the share of the allowable catch traditionally taken by them would not be allocated to the coastal state. The criterion of ability to exploit (coastal state) is in contention with the history of exploitation (foreigners). Recognizing the contradiction elsewhere, the draft urges negotiation between the two parties with respect to traditional fishing rights.

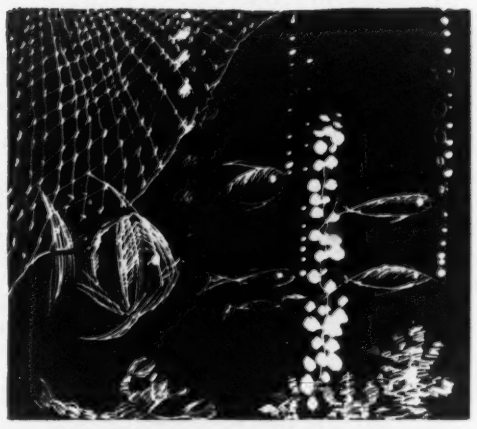
The U.S. position is influenced by its interest in maintaining rights of military passage. Extension of exclusive fishing zones is resisted lest these areas be transformed into territorial seas controlled by the coastal states. The U.S. position, which favors stock-by-stock treatment of each fishery rather than blanket zones of control, has merit from a managerial standpoint, but it does not resolve the question of who gets what share of the stock.

With regard to management of the fisheries, the U.S. proposal is equally unsatisfactory. It speaks of "taking into account relevant environmental and economic factors," but does not specify how this is to be done. Restriction of the capital and labor devoted to fishing is required for efficiency. The guarantee of a specific share of the catch to foreign fishermen might favor a limit on their number. However, under the exploitability criterion the share of the coastal state is expandable, which makes it unlikely that the coastal state would restrict the number of fishermen until it had taken the entire allowable catch.

The necessity for controls on fisheries capital and labor was forcefully presented to Congress at a recent hearing by the director of the National Marine Fisheries Service. He pointed out that the root problems of fisheries lie in the failure of ordinary market forces to make a proper allocation of inputs into a common property natural resource. This is the first time such a statement has been made to Congress by a high government official and it marks the first step toward a system of rational management. But unless the Fisheries Service develops a stronger influence on the Department of State, progress is not likely to be great.

The U.S. draft contains no specific reference to the possibility of treating fisheries as common heritage. However, it apparently intends to provide special treatment for highly migratory stocks, such as tuna and whales, by removing them from the criterion of exploitability by coastal states. This would permit such stocks to be treated as common heritage resources, although it is not specifically proposed.

While the U.S. proposal is unsatisfactory in its treatment of fisheries, it is the only one so far put forward for discussion prior to the 1973 Conference. Unless more preparation is evident by next fall, it may be necessary to postpone the Conference, thereby increasing the temptation to resolve questions by unilateral action rather than international agreement.



STOCKHOLM

PREPARATIONS for the June 1972 UN Conference on the Human Environment in Stockholm went forward throughout the year. Indeed, the preparations may prove as significant as the conference itself, for numerous international agencies, governments, and scientific organizations have been drawn into the process in ways that are likely to have lasting impact.

The actual staff and budget of the Conference's Secretary-General are very small. However, cooperating UN agencies, governments, and voluntary scientific and conservationist groups have generated a great flow of background material. So much, in fact, that the small staff has been hard pressed to digest it.

Early in 1971 there were growing fears that the less-developed countries (LDCs) would not cooperate with the Conference. They had been unenthusiastic participants at the first session of the 27-nation Preparatory Commission meeting and there were many reasons to expect coolness in their attitude. The problems that generated the initial call for the Conference are largely those of rich countries, and it was feared that corrective measures, whether undertaken in the rich countries or in the poor, would present new obstacles to development via their effects on trade, investment, availability of aid, conditions attached to aid grants, and reduced consumption of LDC products.

Recognition of this problem has brought prompt efforts to meet it. An agenda item called "Economic and Financial Implications" was transformed into "Development and

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the Environment" at a meeting in February. The theme caught on quickly. In mid-June, a special panel assembled by the Conference secretariat produced an even-handed paper on the subject which has served as the basis for subsequent regional meetings in Mexico City, Bangkok, Addis Ababa, and Beirut on the same theme. Meanwhile, the U.S. National Academy of Sciences, members of Congress, the International Conference of Scientific Unions and the American Association for the Advancement of Science all sponsored meetings on the subject, the latter calling in its invitation for "a massive new effort . . . to synthesize an environmentally sound approach to development."

Most of the foregoing meetings consciously attempted to relate in one way or another to the Stockholm Conference. At the same time independent groups, such as the Smithsonian Institution, have been attempting to learn what has gone wrong with development spectaculars (Aswan Dam, for example), and how one might avoid future errors. Likewise, international aid givers have begun injecting environmental considerations into development projects.

IN THE COURSE of all of this discussion and conceptualizing, a noteworthy shift has occurred. In 1970 we were discovering the global aspects of environmental problems—pollution of the oceans, atmospheric effects, worldwide transport of pollutants, preservation of unique features and life, etc. In 1971 we turned to the global effect of environmental policies, especially on the developing countries. What is their impact for development and who will bear the cost? There are many questions and few answers.

The Conference Secretary-General, Maurice Strong, determined early that the meeting would face up to these problems. As a consequence, the interest of the LDCs in the Conference has quickened and their concern about the development issue has been substantially defused. While there is yet no agreement on policies or actions, the nature of the issues is much better understood.

The watchward of the Conference is "action." Participating governments are expected to vote on the matters before the Conference, and this expectation is forcing governments to study the official documents with care and to consider the findings of specialists.

The term "action" apparently will be very broadly construed. Almost any kind of recommendation will be an "action proposal," whether it be research on man's ultimate values, a plan to monitor ocean pollutants, or a program to protect internationally treasured landscape features. Although the meaning of action has been stretched a bit, this emphasis on reasonably concrete proposals may serve to prevent the Conference from becoming either a podium for platitudes or a discussion comprehensible at best to technical experts.

The action focus also helps to provide some limit to the scope of the subject matter. For the purposes of the Conference, environment has come to embrace virtually the entire human condition, and many seek consideration of their principal concerns under their rubric —health, soil management, urban forms, etc. Older UN agencies such as the Food and Agriculture Organization and the World Health Organization properly wonder what is new about some of these topics. If the Conference is to avoid becoming a forum for discussion of all of the world's ills, its leadership will face a demanding task of keeping the discussion on track.

NEW TOWNS U.S.A.

THE QUEST FOR a means of structuring urban development in the United States continues. Past efforts such as public housing and urban renewal have not been conspicuous successes. A new overture was made in 1971 as the federal government launched a program for the development of new towns.

New-community legislation made its first appearance in the last days of the Johnson Administration. The most recent act, passed at the end of 1970, established a bureaucratic apparatus for the idea and authorized broad credit, loan guarantee, and grant assistance to qualified developers of new communities. A New Community Development Corporation in the Department of Housing and Urban Development (HUD) is responsible for the new-communities policy, and an Office of New Communities Development has been built up to provide staff support for it. Half a billion dollars of loan guarantees, $250 million in interest payment loans, and $168 million in supplementary public facility grants (through fiscal year 1973), along with other forms of assistance in the act, add up to roughly a billion dollars of assistance authorized for new-community development. Although Congress has failed to appropriate loan and grant funds for the program thus far, the loan guarantee program is well under way with over a hundred million dollars in guarantees already approved.

The U.S. new communities policy takes its inspiration from the postwar British experience in plan-

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ning and building new towns. A ring of new towns around London was conceived as a means of controlling the city's growth. By now the United Kingdom can point to 15 new towns designed to accommodate more than a million people and a dozen more under development that will absorb another one and three-quarters million. British new-towns policy has been modified over the past 25 years but is generally adjudged a success.

New towns in America will be quite different. While the British new town is a deliberate creation of the national government with close control over planning and development, the American new town typically is a private large-scale development scheme aiming to make a profit. The justification for public policy in this field is not to enhance the profitability of the enterprises but rather to ensure that public interests are realized in the course of development.

Four kinds of new communities are to be considered eligible for aid:

1. Economically balanced new communities within metropolitan areas.
2. Additions to smaller nonmetropolitan towns and cities.
3. Major new town–intown developments.
4. New communities away from existing urban centers.

This list allows for new-town assistance to just about everyone. Developer interest will be mostly in the first category—new towns in metropolitan areas where demand is strong. Reston and Columbia (near Washington, D.C.) fall in this group, as do four projects for which HUD has approved loan guarantees—Flower Mound New Town between Dallas and Fort Worth, Park Forest South near Chicago, Charles County Communities near Washington, and Jonathan near Minneapolis. Categories 2 and 4 are designed to appeal to nonmetropolitan areas, including depressed areas. The new town–intown concept qualifies central cities for support under the act, thereby forestalling their opposition to outlying development.

THE NEW TOWN–INTOWN idea—the term itself was first advanced by Harvey Perloff of RFF in 1966—aims at creating upgraded urban environments focused on community centers and schools and extending on into adjacent shopping and work environments. The idea was embodied in 1968 legislation and has become part of the new-communities policy. The first serious proposal for a new town–intown is Fort Lincoln New Town to be built on the largely undeveloped site of the old National Training School for Boys in Washington, D.C. Deepseated divisions within the community over political control have delayed development, although planning continues.

HUD made its first entry into the new town–intown field in the summer of 1971 by approving a loan guarantee to support the Cedar Riverside high-density new community southeast of Minneapolis' central business district. The project covers 340 acres dominated by the University of Minnesota Medical School. It is coupled with a large-scale urban renewal program in the area to provide 12,500 dwelling units and related services and institutions.

Most of the current new town–intown projects have been advanced without explicit promise of HUD support, and they do not fit any common model. One of the most exciting is the New Town proposal for Welfare Island in the East River off Manhattan, which is being planned by a subsidiary of New York's Urban Development Corporation. A densely developed, auto-free layout to be interlaced with parks and served by an electric minibus transportation system, the Welfare Island project will seek to show what high-density living under ideal circumstances can be like when the total environment is well designed and the tyranny of the automobile is overthrown.

New York has two other new town–intown proposals. The most politically controversial is the South Richmond Development Plan for the Raritan Bay area of Staten Island. Prepared at the request of Mayor Lindsay by mortgage banker James Rouse, the builder of Columbia, the plan proposes to more than double the island's population. It would cover 10,600 acres of undeveloped land on the island and require 6.5 billion dollars of public and private capital over a 20-year period to provide housing for 420,000 people and jobs for 180,000. However, many Staten Islanders see this monumental development overwhelming their quiet neighborhoods of single-family housing, and resent it as an intrusion by Mayor Lindsay into local matters.

While the Staten Island proposal is far enough from the city center to make it debatable as an intown project, there is no doubt about the second proposal. At the southern end of Manhattan, the Battery Park City Authority, a state corporation, is quietly planning the redevelopment of 91 acres at the tip of the island; concepts and details are unavailable at this point.

PRIVATELY SPONSORED new town–intown efforts are represented by the proposed Franklin Town project in Philadelphia. Five private corporations and a major Philadelphia bank have replanned 22 city blocks northwest of the City Hall around a new central boulevard lined with shops and connecting a residential development of 4,000 units with a major commercial development at the downtown end of the project. The public contribution to the project is to consist of title to the streets closed in the replanning and use of the Philadelphia Redevelopment Authority's powers of eminent domain, if necessary, to acquire some part of the 11 acres not owned or controlled by the sponsors.

In Hartford a different approach is being tried. James Rouse and a business civic group, the Greater Hartford Corporation, have joined in a broad-scaled regional diagnosis and planning effort known as Greater Hartford Process, Inc., whose major immediate objective is to effect community redevelopment of Hartford's North End. Working with a strongly established community development group, Hartford Process is seeking a development scheme that will mean not only a better living environment for the community, but also a return on the investment to support further

development work. While public planning agencies watch from the sidelines with some skepticism, the business community is trying to find a way to link up with "grass root" institutions to show that community development is good business.

Other more borderline new town–intown developments could be added to this list without adding materially to the perspectives that the new community movement has opened up for the redevelopment of American cities. In the United States new communities are largely a metropolitan phenomenon: they seem to depend on established labor markets and strongly structured regional economies. While suburban new towns represent a natural evolution of large-scale suburban housing developments, the new towns–intown owe little to their urban renewal antecedents in the central city. Their sponsorship, concepts, and approaches are varied. Bypassed underdeveloped land has been an important factor offering opportunities at costs that were acceptable. Versatile as the new town–intown seems to be as a development tool, its main impact is likely to remain in those areas where land assembly and preparation costs are moderate, as where historical accident has preserved a Welfare Island or a National Boys Training School site undeveloped while the tide of urban development swept around it. How much a national new-communities policy can contribute to this approach to central city redevelopment is yet to be discovered.

LAND USE POLICY:

Rumblings of Future Action

LAND USE is the single most important element affecting the quality of our environment which remains substantially unaddressed as a matter of national policy," Russell E. Train, chairman of the Council on Environmental Quality (CEQ), observed last September. Train was testifying on behalf of the Nixon Administration's proposed National Land Use Policy Act, and he may have understated his case. Not even pollution abatement, a problem given much congressional attention during the 1960s, is of more importance to environmental quality than the way land is used. Indeed, in many cases effective prevention or abatement of pollution at reasonable cost may be impossible if intensive industrial or residential development is allowed in the wrong places.

Traditionally, regulation of the use of nonfederal lands has been reserved to the states as part of their police power. The states, however, generally have not sought to regulate land use and have delegated the authority to do so to local government. The limits of local jurisdiction have usually been too narrow to encompass regional environmental systems or to encourage desirable patterns of regional development. Furthermore, local zoning, even where honestly administered, typically has been used only to separate incompatible land uses in urban and suburban areas and not to control land use countywide according to environmental as well as other criteria.

Federal influences on land use in the states have been cautious and indirect. Within the last year or so there has been increasing sentiment in Congress that something more is in order. Literally scores of bills have been introduced that would deal with one or another aspect of land use policy.

Concurrently, a number of attacks upon land use zoning have been made in the courts and before administrative bodies on the grounds that land use zoning as actually practiced is discriminatory in a racial and economic sense. In several state court decisions, zoning actions by local bodies have been overthrown on these grounds. Thus far, no conclusive case has been decided by the Supreme Court, but it seems highly probable that some case will reach that Court and be decided by it, in the not too distant future. Any definitive court action that seriously threatened the legality of land use zoning as it has grown up in the past 50 years would surely spur the Congress and the state legislatures to action.

Senator Henry M. Jackson persuaded his committee to report out an ambitious National Land Use Policy bill as early as the fall of 1970. This complex measure was still undergoing revision and committee consideration in late 1971. Briefly stated, the Jackson bill would require that the states prepare, within five years, enforceable land use plans as a condition for receiving federal funds for new projects having an environmental impact. Federal grants to assist the states with their land use management programs would be generous; a total of up to $100 million would be authorized for such grants each year. Regional land use commissions, each chaired by a presidential appointee and with federal agencies as well as states represented, would be set up to ensure that state plans were mutually compatible. If the Secretary of the Interior disapproved of a state's land use plan, his decision would be re-

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viewed by an ad hoc hearing board established by the President. Planning of objectives would include the protection or reservation of environmentally "critical" areas, "new town" sites, prime agricultural lands, transportation corridors, industrial sites, and the like. Commenting on an early version of this measure, Secretary of the Interior Rogers C. B. Morton observed that its goals were too broad and would lead to diffuse efforts producing no meaningful results.

THE NIXON ADMINISTRATION bill, which Morton and Train have been pushing, is much simpler than the Jackson bill and more limited in its objectives. Its principal aim is to have state governments assume responsibility for three categories of land use problems: (1) protecting environmentally critical areas, with special attention to estuaries; (2) controlling land use in areas affected by the construction of "key facilities," such as interstate highway interchanges and major airports; and (3) keeping controversial land uses of "regional benefit," such as construction of low-income housing, from being excluded from desirable areas by discriminatory local zoning. Under the bill, a state could elect to meet these problems through direct land use planning and regulation, through the establishment of standards subject to judicial enforcement which local governments would have to follow, or by administrative review of local planning and regulatory actions which would be subject to a state veto. Relatively modest 50 percent matching grants would be available to assist the states, with total funds authorized for this purpose limited to $20 million a year. The states would be expected to concentrate their attention on the three problem issues and leave it to the local governments to continue handling the great bulk of land use questions.

The sanctions available in case a state failed to develop an appropriate land use management program would be mild. The first version of the bill proposed by CEQ included a powerful sanction—states not in compliance with the Land Use Act would not have received their full share of federal funds available for new projects such as airports and highways, with the sums thus withheld being distributed to states that had complied. Although this provision was struck from the bill because it conflicted with the President's proposal for revenue sharing without strings, Train has indicated that the Administration would not object if the Congress wrote stronger sanctions into the legislation. As one congressional source put it, "Train was in effect telling us, 'If you put in the sanctions, fine; just so we didn't do it.' "

Although the fund cutoff provided in the Jackson bill does constitute a strong sanction, local governments would inevitably, under the terms of the measure, continue to play a large, if not decisive, role in most major land use decisions. Cities of 250,000 population or more could, at the state's discretion, be excluded from the statewide land use plan, and these would include all the local "metro" or consolidated city-county governments whose territorial jurisdictions are sometimes very large. (For example, Florida's Dade Metro embraces over 2,000 square miles.) Moreover, authority to carry out the land use planning and management responsibilities prescribed under the act could be delegated to regional or local government entities, subject to state review and approval of plans and enforcement procedures. Reviews at the state level of locally developed land use programs might easily become no more than perfunctory. If, on the other hand, the review process were given public visibility and involved the participation of the governor, supported by a competent staff, more objectivity and political accountability would be brought to major land use decisions. The Jackson bill does not say what kind of review mechanism the state should establish and the senator and his staff believe that this important and possibly critical detail must be left for the states to work out themselves.

Work on land use legislation last year was by no means definitive, and it will be some time yet before Congress is ready to act. General land use bills have been considered thus far only in the Interior committees of the Senate and House, and some other committees will want to have their say.

While the immediate prospect for enactment of a national land use bill is uncertain, ultimately passage of such legislation seems likely. To judge from testimony before the Senate Interior Committee by conservation groups, the National League of Cities, the National Governors' Conference, the National Grange, and some resource user groups, there is a developing consensus that a national land use policy is needed. There will be fierce arguments over the details, but in time a policy probably will emerge.

STUMPING THE FORESTER

NEW DEMANDS are being made on forests, both public and private; and as a result, new demands are being made on foresters too.

Conservation organizations have challenged all aspects of public forest management in recent years. Perhaps the outstanding case in 1971 was the suit filed by the Sierra Club and two Alaska groups seeking to prevent a major sale of timber from the Tongass National Forest in southeast Alaska. The conservationists lost the immediate

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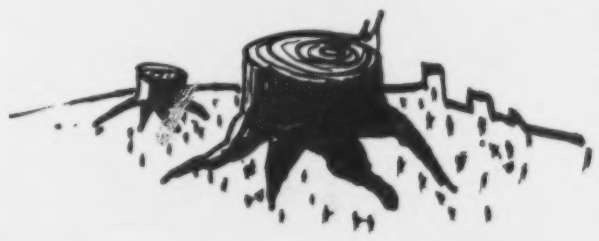
suit (filed in February 1970) when in March 1971 the federal judge ruled (1) that the plaintiffs had failed to exhaust their administrative remedies in a timely fashion and (2) that the sale was not an abuse of administrative discretion as the Club had claimed. The conservationists did win one important victory as the judge affirmed their right to institute a class action on behalf of the larger class of conservationists everywhere. The suit may be appealed.

The controversy over clear-cutting on the national forests continued, with extensive and sometimes rather emotional hearings before a congressional committee in April. Later in the year bills were introduced to declare a two-year moratorium on clear-cutting in the national forests, but even some of the most vocal opponents of clear-cutting did not support such proposals. There were continued challenges to roads through forest areas, such as one opposing a road through parts of the Cherokee National Forest, which it was claimed would seriously damage the Joyce Kilmer Memorial Forest.

From a very different direction came demands for an increased timber harvest. If the Administration's housing goals are to be met, total timber cut from all types and ownerships of forests must rise about 20 to 25 percent in the next few years as compared with the recent past. An interdepartmental Task Force on Softwood Lumber and Plywood filed a report in June 1971, which was primarily a review of all aspects of the forest supply and demand situation, with attention to foreign trade, prices, and related matters. In September the President announced the appointment of a President's Advisory Panel on Timber and the Environment (the panel includes Marion Clawson of RFF); it is to report by July 1, 1972, on means of increasing timber supply while at the same time protecting and enhancing the quality of the environment.

Meanwhile, the Forest Service was re-examining its programs. During the summer it released a report on "Forest Management in Wyoming," which complemented one on forest management in Montana released a year earlier. In each case, study teams of specialists within the Forest Service were asked to review the management of national forests; each team was set up outside of the normal line of command in the Forest Service, and was expected to arrive at an independent judgment about management of national forests in the respective states. Some have been skeptical of the independence of such teams, but the reports have emphasized the ways and the degree in which actual forest management has deviated from multiple use principles. In various public statements throughout the year, top Forest Service officials have conceded errors in operations and weaknesses in forest management practices but have defended the Service's record. They continue with clear-cutting, at least in some areas—and clear-cutting has been the practice most under fire.

Also during 1971, some professional foresters not aligned with forest industries, the Forest Service, or the conservationist organizations have restated and emphasized the principles of good forest management, including the role that clear-cutting and other harvest techniques play; and they have emphasized that some groups within the total citizenry gain from wilderness preservation whereas other groups gain from timber harvest. Meanwhile, spokesmen for the organized conservationist groups have kept up their criticisms of forest practices in general and those of the Forest Service in particular. Forestry is no longer a quiet place to get away from it all.



THE PUBLIC LANDS

THE FINAL REPORT of the Public Land Law Review Commission, published in 1970, gave rise to legislative activity in 1971.

One Third of the Nation's Land is rich in information and contains 137 numbered recommendations scattered throughout chapters dealing with planning of future land use, public policy and the environment, timber, range, water, fish and wildlife, intensive agriculture, outer continental shelf, outdoor recreation, occupancy uses, tax immunity, grants to states, administrative procedures, trespass and disputed title, disposals, acquisitions, and exchanges, federal legislative jurisdiction, and organization, administration, and budgeting policy. The report has impressed nearly everyone, including its critics, with the vigor of its analysis and the positiveness of its recommendations. Commissions of diverse makeup, as the PLLRC was, often "solve" their problems by a retreat into such blandness that no one can quarrel with them—or care about them; but this Commission took up much more forthright positions, which cannot easily be summarized accurately.

During 1971 several bills were introduced in the Congress, to translate some or all of the Commission's recommendations into law. H.R. 7211, introduced by Congressman Aspinall (who was chairman of the Commission) and others, concentrates on administrative, planning, and review processes, and on relationships among governments at state and local levels, as far as federal lands are concerned. It has generally been understood that these sponsors plan later bills with substantive changes in land law. S. 921, by Senator Jackson and seven other senators, in contrast, is much briefer but includes sweeping changes in the content of land laws. It gives the broadest authority to the Secretary of the Interior to issue mineral leases and licences subject to certain goals and objectives. While some guidelines are then given for the Secretary, the simplicity and directness of the bill is almost at the opposite extreme from the present

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detailed, complex, and often restrictive mining and mineral leasing laws. The Department of the Interior also has submitted three bills, one for "the management, protection, and development of the national resource lands and for other purposes," one "to reform the mineral leasing laws," and one "to reform the mining laws."

Though prediction of Congress' actions is always hazardous, it seems probable that some revisions, perhaps major ones, in the laws relating to the federal lands will be made in the years immediately ahead. A major factor underlying all proposals for revision is the recognition of increased public demand for the use of these lands—demands from sectors of the public that did not use the land and often were unaware of its existence a few years ago, as well as increased demands from users of long standing.

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97. *Option Demand and Consumer Surplus: Further Comment,* by Charles J. Cicchetti and A. Myrick Freeman III. From *Quarterly Journal of Economics,* vol. 85 (August 1971).

98. *Solid Residuals Management: Some Economic Considerations,* by Walter O. Spofford, Jr. From *Natural Resources Journal,* vol. II (1971).

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